WASTE MANAGEMENT GUIDANCE

WASTE CHARACTERIZATION

Businesses need to determine if the waste they generate is hazardous or non hazardous. If the materials used, or the process generating the waste changes, or there are other impacts from business operations that may change the waste (e.g. cross contamination from aerosol overspray), it will be necessary to re-evaluate the waste characterization. The regulations do not require a specific timeframe like annually to re-evaluate the waste. You may want to check if the disposal company has a retesting schedule.

Keep any records obtained during waste determinations (i.e., test analysis results, material safety data sheet (MSDS), or other documentation such as product information from a supplier or manufacturer) at least three years from the time the waste stream was last sent for treatment, storage, or disposal.

Who can do waste characterizations for a business?

A business may either:

- Hire a consultant or use a disposal company's waste characterization services. Be aware the waste generator is still ultimately responsible for meeting the waste regulations.
- Characterize the waste themselves by either:
  - Using knowledge of the material and the process it came from. Information from the material safety data sheets (MSDS), supplier and manufacturer literature, or other documentation may be useful when you have unused product needing disposal. A MSDS often provides information about the flashpoint, pH, or if a discarded product is a hazardous waste. A MSDS is not completely reliable for determining if a used material is hazardous waste because it does not include information about contaminants that might be in that waste. A waste stream may be presumed to contain certain constituents above regulatory thresholds for compliance purposes, but disposal facilities may still require testing before accepting a waste stream.
  - Having a representative sample of the waste tested.

What are testing requirements?

It is recommended a business or consultant contact the disposal company before testing. They might require specific tests or only accept data from specific laboratories. Ask the disposal company for a list of these tests, the purpose of the tests, approved testing methods, and acceptable laboratories. This step will prevent you from spending money on laboratory tests that are not necessary or do not meet the disposal company's requirements. The waste rules identify which laboratory methods can be used. If the waste is from cleanup activities, see the methods in the Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria but before testing discuss your cleanup situation with MDEQ staff.

It is wise to obtain estimates from two or more laboratories. In some cases, the tests will save you money by showing that you do not have hazardous waste. When hiring testing services, use a reputable firm and obtain a written contract. The contract should clearly identify which specific services the company will provide. For example, instead of vague language about sampling waste, identify:

- Who is responsible for collecting samples?
- Who will arrange to have it analyzed?
- Who will arrange to have an expert look at the analysis results?
- Who will determine if the waste is hazardous and at which regulatory limit?

Waste samples being sent to laboratories are exempt from most of the hazardous waste regulations if it meets certain conditions. Submit the smallest sample amount as possible for testing (typically less than one gallon), and the laboratory may return any remaining waste sample to the generator. The exemption no longer applies when the sample is determined to be hazardous waste and is no longer needed for waste characterization purposes.

Contact the laboratory about its procedures for accepting samples. When shipping the sample, you must meet U.S. Postal Service or US Department of Transportation (US DOT) labeling and shipping requirements. US DOT questions can be directed to Michigan State Police, Motor Carrier Division or the US DOT at 800-467-4922. If these agencies' regulations do not apply to the sample, it must be packed so it does not leak, spill, or vaporize. Waste samples being shipped to a laboratory are not required to be manifested, but the following information must accompany the shipment:

- Sample collector's name, mailing address, and telephone number.
- Laboratory's name, mailing address, and telephone number.
- Date of shipment.
- Quantity of the sample.
- Description of the sample.

What are common laboratory tests?

The **paint filter test** is a method used to determine the presence of free liquids in a representative sample of waste. A predetermined amount of material is placed in a paint filter. If any portion of the material passes through and drops from the filter within the 5-minute test period, it contains free liquids. If these wastes are not regulated under the hazardous waste regulations, they are regulated under Part 121 of Act 451 as a liquid industrial waste.

A **Toxicity Characteristic Leaching Procedure (TCLP)** is used to determine if a waste has toxicity characteristics in amounts that meet or exceed regulatory limits causing it to be regulated as hazardous waste. The TCLP test method 1311 can be found in the EPA publication SW-846 .The TCLP was designed to predict whether a waste is likely to leach chemicals into groundwater. It simulates the conditions a waste might encounter in a typical municipal solid waste landfill. Be aware that it is not necessary to identify every chemical component of the waste in order to meet the hazardous waste regulations and ensure adequate treatment or disposal. It may not be necessary to run a TCLP for every constituent included on the "D" list if you are familiar with your process. For example, you may only need to have a TCLP done for metals and volatiles if you know that the other constituents are not present in the waste. If you are unsure of the types and concentrations of hazardous contaminants present in the waste, a cost-effective option to running a TCLP test is to first run a total waste analysis to demonstrate if a waste exhibits toxicity characteristics. If the waste is 100% solids, divide the total constituent concentration by 20 and then compare the resulting theoretical concentration to the regulatory limit in Table 3. This is sometimes called the 20 times rule. If no theoretical concentration equals or exceeds the regulatory limit, the solid cannot exhibit the toxicity characteristic and the TCLP does not need to be run. If the waste is a liquid or contains both liquids and solids, go to www.epa.gov/rcraonline and search for "Total Waste Analysis" for more information and formula to convert totals results.

In other situations, you may only need to know if a liquid waste is ignitable and can request a **flashpoint test**; or to find out if it is corrosive, a **pH test** can be done.

Special tests might be required if you have drums or containers of mixed or unidentified old waste. You may be able to minimize laboratory testing costs by providing information about your waste streams and operations that were previously collected during your waste survey.

Although it is not commonly done, you may be able to conduct some tests on your own to determine if you have hazardous waste. For example, used oil can be tested on-site by using a commercial test kit to determine if it contains **total halogens** greater than 1,000 ppm requiring it to be handled as a hazardous waste. Discuss these testing options with your permitted and registered waste transporter, treatment, storage, and disposal facility (TSDF), or recycling company to see if they will accept these test results.

Steps when doing waste characterizations

A. Conduct a waste survey to identify all your waste streams. Hazardous waste may be generated in many areas of your business from the shop floor to offices. Following are some commonly overlooked wastes. Reasons why it may be a hazardous waste are in parenthesis.
   - Spent fluorescent tubes and other lighting fixtures (toxic for mercury).
   - Disposable rags containing free liquids with a flashpoint of less than 140 degrees Fahrenheit or used with a listed solvent (ignitability, spontaneous combustion, used with “F” listed solvents).
   - Spent activated carbon media, included in some air filters and other equipment (contains “F” listed solvents).
   - Used solvents with low flashpoint (toxic, ignitability).
   - Used solvents with high flashpoints (toxic and ignitable contaminants).
   - Drain or sump sludge, including loading/unloading area trenches (contains toxic metals or “F” solvents, ignitability due to gasoline from trucks).
   - Painting materials and waste including paint thinners, enamel reducers, epoxies, primers, enamels, solvent-based paints, and paint booth filters (contains “F” solvents, metals, ignitability).
   - Aerosol cans that are not empty (contains “U” or “P” chemicals, ignitability).
   - Solvent-based adhesives (ignitability).
   - Batteries - lead acid and dry cell (toxic for lead and mercury, corrosive).
   - Used water-based or synthetic lubricating fluids containing high concentrations of heavy metals (toxic metals of concern include lead, chromium, cadmium, and barium).
   - Listed wastes mixed with another nonhazardous waste.
   - Office computer equipment (may contain lead in the cathode ray tubes, mercury switches, batteries).
   - Discarded, unused chemical products from inventory reduction activities (any of the commercial chemical products on the “P” and “U” lists in the state or federal regulations).
   - Medical kits containing mercury thermometers or antiseptics containing mercury (toxic).

B. Identify if the material can be used “as is” without any processing, filtering, etc. and thus can be used as a product and not be disposed of as a waste. Consider using material exchanges, associations, or other business connections to find another company that can use the product.

C. Identify if the material is a characteristic and/or listed hazardous waste as identified in “Part 2 Identification and Listing of Hazardous Waste” of the hazardous waste rules and Part 111, Hazardous Waste Management, of the Natural Resources and Environmental Protection Act 1994 PA 451 (NREPA). Be aware Michigan regulations identify more hazardous wastes than US EPA under the federal Resource Conservation and Recovery Act (RCRA) and rules.

   Consider these five questions when doing a hazardous waste characterization:

   1. Is the unwanted material a waste (solid, semisolid, liquid, or gas)?
   2. Is the material specifically excluded or exempted from the hazardous waste regulations? See the complete descriptions in the Part 111 rules. Some common materials include:
      - Universal waste, which includes electric lamps (e.g. fluorescent and other light bulbs), batteries, devices containing mercury, consumer electronics including computers, certain pesticides, and pharmaceuticals
      - Reusable shop towels or other textiles that do not contain free liquid and are sent to a commercial cleaning service
      - Scrap metal when recycled
      - Some materials being recycled such as used oil and filters and lead acid batteries
      - The remaining residue in “empty containers”

3. Is the waste a "listed" hazardous waste? To be considered listed waste, either the chemical or the process to generate the waste is specifically included in the rules. Listed wastes include “F,” “K,” “P,” and “U” in the hazardous waste number. In some instances, if listed hazardous waste is combined with other non-hazardous wastes, those wastes may be regulated as listed hazardous waste. See Chapter III of the EPA publication “RCRA Orientation Manual” for an overview of the “mixture and derived from” and the “contained in” rules along with an overview of hazardous waste characterization and exemptions/exclusions. For a printed copy, call 800-424-9346 to order document # EPA 530-R-02-016.
4. Does the waste exhibit a characteristic of hazardous waste? The waste could be flammable, corrosive, reactive, or it meets or exceeds the toxicity levels identified for 40 materials identified in administrative rule R 299.9217 and materials listed in R 299.9219. Characteristic wastes include “D” and “S” in the hazardous waste number.
5. Is the waste subject to the Land Disposal Restrictions (LDR)?

D. If the waste is not hazardous waste, does it contain free liquids which would make it a Part 121 liquid industrial waste in Michigan? Does it meet any exclusion listed in Part 121? If you are unsure if liquids are present, it may be necessary to have a paint filter test done. Please note used oil has requirements under both Parts 121 and 111. Process wastewater discharged to a septic system is normally regulated as Part 121 waste and not Part 117 septage waste, and that septic system may need a groundwater discharge permit from the DEQ Water Bureau.

E. If it is not hazardous waste or a liquid industrial waste, is it a Part 115 solid waste or Part 169 scrap tire or NESHAP regulated asbestos waste? Does it meet any exclusion included in these regulations? See the MDEQ website about landfill prohibited wastes.

F. In some instances, it may be necessary to determine if the material is a regulated medical waste or radioactive material waste or regulated under the federal Toxic Substances Control Act (TSCA) such as PCB waste.

Additional waste characterization resources

- EPA publication “Guide for Industrial Waste Management” chapter 2 “Waste Characterization”
- RCRA Training Modules including “Hazardous Waste Identification”, “Exclusions”, and “Definition of Solid Waste and Hazardous Waste Recycling”
- Federal List of Lists can help identify federal RCRA listed and toxic hazardous wastes. It does not include all characteristic wastes nor the additional listed Michigan hazardous wastes.
- Chapter 2 of the Michigan Manufacturers Guide to Environmental, Health and Safety Regulations for MDEQ information
- Use Internet tools such as the EPA Envirofacts Master Chemical Integrator and MSDS information to search for chemical and hazardous waste information. MSDS can be obtained from the product supplier, manufacturer, or Internet such as the SIRI MSDS Index
- Purchase characterization publications from private companies or associations. For example, the American Society for Testing and Materials has their ASTM Manual 42 RCRA Waste Management: Planning, Implementation, and Assessment of Sampling Activities. This is not a DEQ endorsement for this manual.
- Discuss waste characterization requirements with the Waste and Hazardous Materials Division District Office.

☒ Not properly characterizing waste and keeping documentation are common waste violations.

Summaries of waste generator categories

Proper waste characterization is necessary so a business can calculate how much regulated waste they generate and thus the business can determine which regulations apply to their waste.

The solid waste regulations do not have categories for generators. Check if there are local ordinances regarding frequency of solid waste pickup and privacy fencing requirements for dumpsters. Also check with the landfill and waste hauler regarding what wastes and how they will accept it, especially with specific solid wastes like asbestos.

The following tables summarize three different waste generator levels. A business may need to notify about regulated waste activity and apply for a site identification number on the form EQP5150. The form instructions provide additional information about regulated waste activities. The identification number is used on the waste manifest when shipping waste off-site.

TABLE 1
LIQUID INDUSTRIAL WASTE GENERATOR SUMMARY (includes most used oil)

	Amount generated in calendar month	**Maximum amount that can be accumulated on-site**	**Maximum time period before waste must be shipped**
Liquid Industrial Waste and Used Oil Generator	Any amount unless exempted[1]	No maximum amount[2]	No state time limit as long as containers in good shape and closed, but check local ordinances

[1] See Parts 111 and 121 and used oil guidance for some possible exemptions

[2] Other regulations requiring containment and emergency planning may apply when threshold management quantities are met e.g. federal Spill Prevention Control and Countermeasure (SPCC) for oils and state Part 5 rules "Spillage of Oil and Polluting Materials"

TABLE 2
SUMMARY OF UNIVERSAL WASTE[1] HANDLER CATEGORIES

	Amount of all universal waste accumulated at any time	**Maximum amount that can be accumulated on-site**	**Maximum time period before waste must be shipped**
Small Quantity Handler (SQH)	Less than 5,000 kilograms (11,000 pounds)	Less than 5,000 kilograms (11,000 pounds)	1 year after generated or received from another facility
Large Quantity Handler (LQH)[2]	5,000 kilograms (11,000 pounds) or more	No maximum amount	1 year after generated or received from another facility

[1] Universal waste includes electric lamps (e.g. fluorescent and other light bulbs), batteries, devices containing mercury, consumer electronics including computers, certain pesticides, and pharmaceuticals.

[2] If the LQH status is reached, the business must keep that designation through the end of that calendar year.

It is necessary to know how much hazardous waste is generated in a calendar month when notifying about regulated waste activity. If a business is on the border of a generator category, it is recommended they keep a simple written log by the waste container that shows when and how much hazardous waste was generated per month as documentation to support the status level they notified at. For example:

Waste Paint Solvent			
Date waste added:	**How much added:**	**By:**	**Running total**
1/3/06	1 gal	George G.	1 gallon
1/15/06	6 gal	Pat M.	7 gallons

A company may lower their hazardous waste generator status if they implement waste minimization and other pollution prevention practices. They may choose to handle specific hazardous wastes as universal waste and that amount is not included when calculating the hazardous waste generator status.

TABLE 3 SUMMARY OF HAZARDOUS WASTE GENERATOR STATUS CATEGORIES					
	Amount of non acute hazardous waste generated in 1 calendar month	**Approximate volume of non acute hazardous waste[1]**	**Amount of acutely or severely toxic hazardous waste generated per month[2]**	**Maximum amount of non acute hazardous waste that can be accumulated on-site**	**Maximum time period before waste must be shipped**
Conditionally Exempt Small Quantity Generator (CESQG)[3]	Less than 100 kilograms (220 pounds)	Less than half of a 55gallon drum, or 25 gallons[1]	Less than 1 kilogram (2.2 pounds)[2]	1,000 kilograms (2,200 pounds)	No time limit unless amount exceeds 2,200 pounds
Small Quantity Generator (SQG)[3]	At least 100 kilograms (220 pounds) but less than 1,000 kilograms (2,200 pounds)	One-half to five drums, or 25 to 250 gallons[1]	Less than 1 kilogram (2.2 pounds)[2]	6,000 kilograms (13,200 pounds)	180 days, unless shipping over 200 miles, then 270 days
Large Quantity Generator (LQG)	1,000 kilograms (2,200 pounds) or more	Five full drums, or 200-250 gallons[1]	1 kilogram (2.2 pounds) or more[2]	No maximum amount	90 days
[1]The liquid volume is only given as an estimate and is based on the waste having approximately the same weight and volume equal to water. Your liquid hazardous waste might have a different volume based on its weight. The regulations state amounts by weight.					
[2] Acutely hazardous wastes have "P" in their waste number and severely toxic wastes are those with an "S" in their waste number. Additional acutely hazardous wastes are identified by an (H) in the hazard code column of the other listings.					
[3]If you are registered at one generator status but have a monthly hazardous waste shipment larger than the quantities allowed at that status, then you will need to update your generator status by re-notifying on the form EQP5150 and meet all the requirements for that generator status. Businesses may change their hazardous waste generator category throughout the year as needed. The annual user charge will be based on the highest generator category the business was during the year.					

Please see the other WHMD guidance documents on waste generator requirements and be aware that other agencies also have requirements that apply to hazardous waste management.

If you are unsure who to talk to about waste characterization, call the **Environmental Assistance Center** at **800-662-9278,** or E-mail **deq-ead-envassist@michigan.gov** for a referral.